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TITLE: MULTI-PRINT CONTROL SYSTEM

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ABSTRACT:

PURPOSE: To print a large quantity of data in a short time by dividing the print data for each page into the pieces equivalent to the number of printers, sending these divided print data to each printer, and printing the print data through the printers in parallel to each other.

CONSTITUTION: A data processor connected to a network transfers the print data to the printers connected to the network and prints these data. In such a print control method, the number of printers that are actually used is decided (2, 3) among those printers connected to the network. Then the print data are divided for each page into the pieces equivalent to the number of printers to be used (4-6). These divided print data are sent to the printers and printed there in parallel to each other (7, 8). In such a constitution, an existing network system and shared resources can be used as they are and plural printers are simultaneously actuated. Then a large quantity of data can be simultaneously by plural printers and therefore the printing time can be shortened.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the printing control approach of a printer, and relates to the suitable multi-printing control approach to print a lot of data especially for a short time.

[0002]

[Description of the Prior Art] When the data processor connected to the network prints the data for printing with a server subordinate's shared printer, print data are sent out to the hard disk of a server, and it is printing under control of a server using a shared printer.

[0003] In addition, JP,55-3098,A is one of things relevant to the conventional technique.

[0004]

[Problem(s) to be Solved by the Invention] When print data are a huge amount, it will act as those who the printer under printing is occupied for a long time for the printing, and are waiting for printing again for a long time until printing ends. Networks, such as LAN, spread like recent years and the example in which two or more servers moreover equipped with a printer as a shared resource are prepared in a network has increased. For this reason, even if long duration occupancy of one set of the printer is carried out, other users do not have inconvenience. However, when a lot of data needed to be printed even for the meeting which starts, for example in the afternoon, about compaction of this printing time amount, consideration was not carried out conventionally.

[0005] The purpose of this invention is to offer the multi-printing control approach which can print a lot of data in a short time, when two or more printers are connected to the network.

[0006]

[Means for Solving the Problem] The above-mentioned purpose is deciding the number of the printer which uses for printing among the printers by which the data processor connected to the network is connected to a network in the printing control approach which prints by sending out print data to the printer connected to the network, sending out the print data which divided and divided print data into a part for said number of a printer per page to each printer, and making it print to juxtaposition by each printer, and is attained.

[0007]

[Function] When you print a lot of data by one set of a printer, suppose that it took 1 hour. Five sets of printers are connected to the network, among these if they will share printing with these three sets supposing three sets are usable at idle status, and it carries out, printing will be completed in 20 minutes. Thus, in operating two or more sets of printers in parallel, printing

will be possible for a short time, and it will contribute also to a deployment of a shared resource.

[0008]

[Example] Hereafter, one example of this invention is explained with reference to a drawing. Drawing 1 is a flow chart which shows multi-printing control. In the computer system which adopted the multi-printing control approach by this invention, when a multi-printing demand is advanced, it judges whether communication software is installed at step 1. If not installed, multi-printing control is ended, but if installed, usable printer check processing of step 2 will be performed. This is processing which investigates the number of an usable printer and is stored in a table. Next, the number of an usable printer is checked at step 3, and when one set cannot be found, either, multi-printing control is ended. Next, pagination computation is performed at step 4. This is processing which computes the pagination of the document data for printing. Next, the amount computation of page unit documents is performed at step 5. This is processing which computes the amount of documents for every page, and is stored in a document information storing table. Next, printer selection processing used is performed at step 6. This processing is processing which stretches a virtual circuit between the remote printers specified by the user, and has become an interface with a user. Next, group division processing is performed at step 7. It is the processing which a user is made to choose whether this performs a group division in order of a page, or a group division is performed so that each group's amount of documents may become equal, and performs group division processing corresponding to it. Next, document data transfer processing is performed at step 8. This is processing which transmits each group's document data to the printer corresponding to the group.

[0009] Drawing 2 is a flow chart which shows usable printer check processing. This processing is performed when judged with communication software being installed. First, a printer information table is initialized at step 21. Next, the Server Name list connectable at step 22 is acquired. Next, the number of servers connectable at step 23 is checked. When the number of servers is 0, usable printer check processing is ended. Next, a list of a server resource is acquired from a server connectable at step 24. Next, the printer information in a server resource list is set to a printer information table at step 25. Next, it is confirmed whether there is any server connectable with others at step 26. When there is no server connectable with others, usable printer check processing is ended.

[0010] Drawing 3 is a flow chart which shows pagination computation. This processing is performed when judged with an usable printer existing. First, pagination is computed from the form information and the amount of documents of document data at step 41, and it saves to a work area 1 (refer to drawing 10). Next, the number of the newpage notations in document data is counted at step 42, and other pagination is computed by the exact document by adding it to a work area 1.

[0011] Drawing 4 is a flow chart which shows the amount computation of page unit documents. First, Page No and the amount of documents (byte count) of the 1st page are set to a document information storing table (refer to drawing 10) at step 51. Next, it judges whether there is degree page at step 52. When there is degree page, after making it progress to the page concerned, when it branches to step 53 and degree page cannot be found, it branches to step 55. Next, Page No and the amount of documents (byte count) of the page concerned are set to a document information storing table at step 53. Next, the start address of the page information field concerned is set to the pointer area of

the last page information field in a document information storing table at step 54, and it branches to step 52. Finally the information meaning being the last page is set to the pointer area of the page information field concerned in a document information storing table at step 55, and the amount computation of page unit documents is ended.

[0012] Drawing 5 is a flow chart which shows printer selection processing used. First, the contents of the printer information table are expressed as step 61, and a user is told about an usable printer. Next, a user is made to choose the printer to be used out of the printer displayed by step 61 at step 62. Next, a virtual circuit is generated between the printers (server) chosen by step 62 at step 63, and printer selection processing used is ended.

[0013] Drawing 6 is a flow chart which shows group division processing. First, a user is made to choose whether a group division is performed in order of a page at step 71, and whether a group division is performed so that each group's amount of documents may become equal. Next, a user's selection result is judged at step 72. When a user's selection is what performs a group division in order of a page, it branches to step 73, and when it is what performs a group division so that each group's amount of documents may become equal, it branches to step 74. When a user's selection is not which, either, it branches to step 71, and selection is urged again. Next, by performing the order group division processing of a page of step 73, or the amount of documents equal group division processing of step 74, a group division is performed and group division processing is ended.

[0014] Drawing 7 is a flow chart which shows the order group division processing of a page. First, the group number is set to a document information storing table for what broke pagination by step 731 with the number of the printers used from a head page as pagination per group, and a group division is performed. Next, a work area 2 is initialized at step 732 (maximum is set). Next, the amount of documents of the page contained in each group at step 733 is totaled, and the amount of documents for every group is computed. Next, step 734 compares the difference of the maximum of the amount of documents for every group, and the minimum value with a work area 2. Next, the comparison result by step 734 is judged at step 735. Consequently, since it branches to step 736, and the difference of the amount of documents between groups becomes min when the work area 2 is smaller when the work area 2 is larger, it branches to step 738. Next, the difference of the maximum of the amount of documents for every group present at step 736 and the minimum value is set to a work area 2. Next, by shifting all the boundaries between groups to 1 page back at step 737, group organization is changed and it branches to step 733. Finally the boundary between groups is returned 1 page ago at step 738, and the order group division processing of a page is ended.

[0015] Drawing 8 is a flow chart which shows the amount of documents equal group division processing. First, the group number is set to a document information storing table from a page with the large amount of documents at step 741 at ascending order. Next, when judge and there is [whether it remains at step 742 and there is any page (page by which a group division is not carried out), and] nothing, the amount of documents equal division processing is ended. Next, the group number is set to a document information storing table from a page with the large amount of documents at step 743 at descending order. Next, it judges whether it remains at step 744 and there is any page (page by which a group division is not carried out). When it branches to step 741 when there is the remaining page, and there is nothing, the amount of documents equal division processing is ended.

[0016] Drawing 9 is a flow chart which shows document data transfer processing. First, the contents of the work area 3 which shows the group number at step 81 are initialized (0 is set). Next, the contents of the work area 3 are incremented at step 82, and the contents of the work area 3 judge [a group] whether the maximum of the group number was exceeded at step 83. When the contents of the work area 3 exceed the maximum of the group number here, it branches to step 81 and the contents of the work area 3 are initialized again. Next, the minimum thing of Page No is transmitted to an applicable printer out of the waiting document data for printing belonging to the group number which a work area 3 shows at step 84. Next, it judges whether it is whole sentence document printing termination at step 85, if it is not termination, it will branch to step 82 and data transfer processing of the next group will be performed, and if it is termination, document data transfer processing will be ended.

[0017] According to this example, in the environment where the personal computer is connected by the network, the multi-printing control approach in this invention is applicable so that clearly from the above explanation. Moreover, especially when two or more servers equipped with a printer all over a network exist, it is suitable, and a printer resource can be used effectively by carrying out simultaneous operation of two or more printers, and printing time amount can be shortened.

[0018]

[Effect of the Invention] Since according to this invention use an existing network system and an existing shared resource as it is, operate two or more printers to coincidence, each printer is made to distribute a lot of data and it prints, it is effective in the ability to shorten printing time amount.

[Translation done.]